

Prevalence Of Denture Stomatitis And Infections In Complete Denture Wearers - An Institution Based Retrospective Study

Research Article

Jerusha Santa Packyanathan¹, Padma Ariga^{2*}, Ganesh Jeevanandan³¹ Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, India.² Professor, Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, India.³ Reader, Department of Pedodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, India.

Abstract

Rehabilitative treatment is only successful when patients are motivated and aware of correct prosthesis use and hygiene. Poor oral hygiene is common among denture wearers, which also contribute to the development of denture stomatitis, candidal infections and traumatic ulcers. A complex polymicrobial biofilm is able to proliferate on the surface of denture materials and matures to form visible denture plaque. This denture plaque biofilm stimulates a local inflammatory process that is detectable clinically as erythema, and hyperplasia. The main aim of this cross-sectional study is to estimate the prevalence of denture stomatitis and infections in medically compromised patients associated with long term denture use and to identify the cause for the same. This is a record based study with a sample size of 415. The present study was conducted among completely edentulous patients between the age group of 30 -80 who visited the outpatient department at the Institution. The data retrieved from the dental records were patient age, gender, medical complications and prevalence of traumatic ulcer, denture stomatitis and candidal infections. The coding was done in MS excel. The data was transferred to a computer and processed using SPSS software version 21.0 (SPSS Inc., Chicago, IL, USA) by tabulation and graphical illustration. Descriptive statistics was used to study the data collected and to analyse frequency distribution. One way ANOVA was used to compare prevalence of denture stomatitis, candidal infections and traumatic ulcers with the medical status of the patient. The level of significance was set at 5% ($P < 0.05$). Maximum number of completely edentulous patients were between 60-69 years (39%) and 55% of them were males. Of the total number, 12% of complete denture wearers were diagnosed with denture stomatitis, 6% diagnosed with traumatic ulcers, 3% diagnosed with candidal infection. The frequency distribution of patients according to their medical status shows 66% had no medical complications, 18% had diabetes and 12% hypertension, 2% asthma and 2% thyroid. The One way ANOVA test showed a strong significant association between medically compromised individuals and the occurrence of denture stomatitis, candidal infection and traumatic ulcer (P value = 0.003, $p < 0.05$).

Keywords: Candidal Infections; Completely Edentulous Patients; Denture Stomatitis; Traumatic Ulcer.

Introduction

Post-operative care and denture maintenance is as important as the fabrication of the denture. Denture hygiene must be taught for each patient wearing a denture and regular check-ups should be done in future for regular denture wearers [42]. Ignorance of dental hygiene leads to mucosal irritation, ulcers, infections and reduced usage of prosthesis leading to malnutrition, weight loss

and systemic implications [21, 8]. Most elderly patients prefer removable prosthesis [24] when compared to fixed prosthesis in the form of implants [2, 25, 17] and crowns, magnetic and other prosthesis [6, 38] etc. This is because the fabrication of a fixed prosthesis demands more sittings, more complex procedures for measurements [26], determining crown size [5] and are even more costly [7, 22, 34].

*Corresponding Author:

Padma Ariga,
Professor, Department of Prosthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha University, Chennai, India.
Tel: 9381041945
E-mail: padma@saveetha.com

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Denture stomatitis [31] are mucosal lesions which are more frequently found in the upper jaw, especially on the palatal region. The lower prevalence of denture stomatitis in the mandible is probably due to the clearing action of saliva. Despite the fact that denture stomatitis is frequently asymptomatic, common symptoms include halitosis, slight bleeding and swelling in the involved area, or irritation, xerostomia, or taste modification (dysgeusia) [20]. However it can be easily treated and it is not a complex condition [40].

Denture stomatitis most frequent in patients wearing complete dentures. A yeast count in saliva ≥ 400 cfu/ml increases the occurrence of stomatitis. In individuals who develop denture stomatitis, the most commonly encountered species was found to be *C. albicans*. Prosthetic hygiene was proportional to the intensity of candidal growth and the occurrence of Denture Related Stomatitis. *C. albicans* live as saprophyte in the oral cavity. But, it is capable of initiating infection if there are predisposing conditions associated to the host. Usage of removable dentures may cause these microorganisms to obtain pathogenicity [1].

Candidal infections are predominantly seen in patients with Type 2 diabetes Mellitus [14]. These candidal infections are a risk factor to occurrence of denture stomatitis [33]. older patients are more prone to the occurrence of chronic systemic conditions. These patients also have widespread denture users [29]. The clinical examinations of the institutionalised older population showed that 54% of the individuals had denture stomatitis, and yeasts were recovered from 78%. The yeasts species isolated were *Torulopsis glabrata* and *Candida albicans* [13]. Traumatic ulcer was the third most frequent soft tissue lesion. It was also found to be one of the frequent soft tissue lesions in Spain, Italy, and Chile elderly and in the institutionalized elderly in Denmark [21-24].

Patient awareness and education on maintenance of denture reduces discomfort and increases efficiency of the prosthesis. Thus, the aim of the study is to estimate the prevalence of denture stomatitis and infections in medically compromised patients associated with long term denture use and to identify the cause for the same.

Materials and Methods

Study setting

In this retrospective study, data from 415 patients within the institution were collected from dental records. At data extraction, all information was anonymized and tabulated onto a spreadsheet. The study was commenced after approval from the Institutional Review Board. The ethical approval number for the study was SDC/SIHEC/2020/DIASDATA/0619-0320.

Data collection and/tabulation

To fulfil the inclusion criteria, patients who were completely edentulous and wearing dentures were included in the study. The medical status was assessed in these patients. Patients who were not wearing complete dentures and those unwilling for the study have been excluded.

Sampling

Data were collected from June 2019 to March 2020 for 415 patients who underwent replacement in the form of complete dentures. The following data were retrieved from the dental records: patient age, gender, medical complications and prevalence of traumatic ulcer, denture stomatitis and candidal infections.

Statistical analysis

The data was transferred to a host computer and processed using SPSS software version 21.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics and One way ANOVA were used to compare the prevalence of traumatic ulcer, denture stomatitis and candidal infections with the medical status of the patient. The significance level was set at 5% for the present study.

Results And Discussion

The data collected was analysed using IBM SPSS software. The results are as follows.

In our study it was noted that the highest number of complete denture wearers were between the age of 60-69 years. This is in accordance with another study which showed the average age of complete denture patients in their study was 67.3 years [10]. Another study states an increase in patients older than 55 years wearing dentures [16].

About 20% in our study had reported with post- insertion complications out of 415 complete denture patients of which 55% were males and 45% females. Of this 20% only 45% reported to have medical complications. Our results showed a higher prevalence of oral mucosal lesions among females (57.7%) and young adults (31-40 years) (21.4%). Other reports, however, indicated that oral lesions tend to increase with age in relation to tobacco consumption and denture use [27, 36]. This is contradiction to another study which states that Completely edentulous patients were found to be at higher risk for poor nutrition, coronary artery plaque formation, asthmatic, diabetic, rheumatoid arthritis and for certain cancers [19].

Our study showed 34% of the completely edentulous population had medical conditions. This was in accordance with another study that showed association of systemic conditions with edentulousness. Advanced age was related to an edentulousness [43]. The prevalence of diabetes in our study was 18.3% while it was diagnosed in 13% in another study of complete denture patients [41]. The percentage of asthmatic patients in our study was 1.9%. The relationship between asthma and total tooth loss might suggest a local oral effect of medications used by asthmatic patients [43].

Denture stomatitis has been reported in 11–67% of the population wearing complete denture. It is more frequent on the palatal mucosa and in women patients [4]. Even in our study, the most common post-op complication in complete denture wearers is the occurrence of denture stomatitis and among women. Evidence is presented incriminating *Candida albicans* colonization of the fitting surface of the prosthesis in many cases of denture stomatitis

Figure 1. Bar diagram representing age distribution of patients with complete dentures. X-Axis represents the age group distribution of patients with complete dentures and Y axis represents the number of completely edentulous patients. It is seen that highest number of denture wearers (39.28%) were between 60-69 years (orange), followed by 27.95% among 50- 59 years (green), followed by 19.04% among 70 years and above (yellow) , followed by 11.57% were between 40-49 years (red) and the least from 30-39 years (2.17% ; blue).

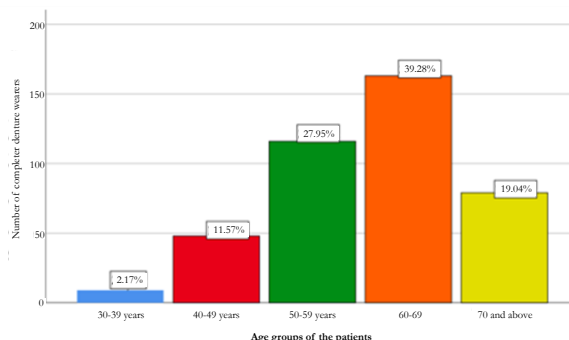


Figure 2. Bar diagram representing gender distribution of male and female patients with complete dentures. X-Axis represents the gender group distribution of patients with complete dentures and Y axis represents the number of completely edentulous patients. The number of completely edentulous male (blue) patients (56.4%) outnumbered female (red) patients (43.6%) as shown in the graph.

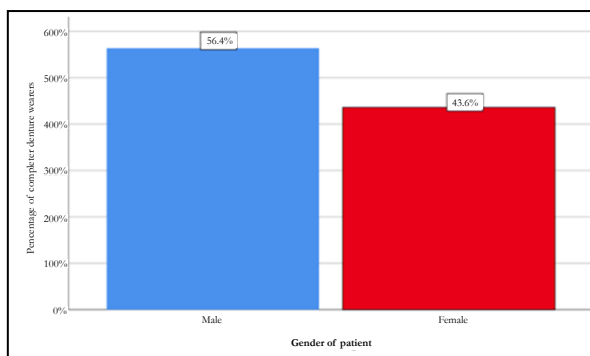
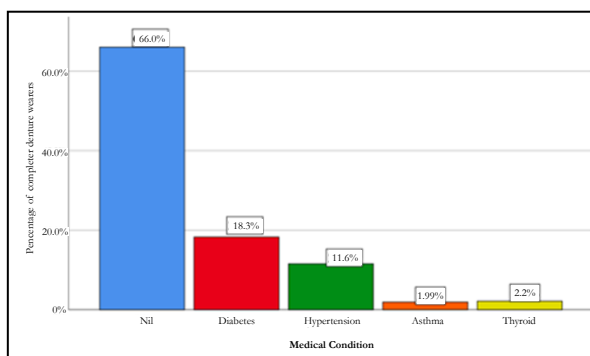


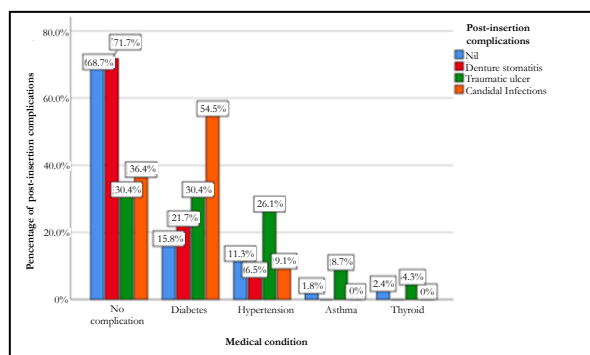
Figure 3. Bar diagram representing prevalence of systemic complications in patients with complete dentures. X-Axis represents type of medical condition and Y axis represents the number of complete denture wearers. Of the total population, 66% had no systemic complications (blue), 18.3% had diabetes (red), 11.6% had hypertension (green), 2.2% had thyroid (yellow) and 1.9% had asthma (orange).



developed by continuous denture wearing. Allergic and primary local reactions to the denture base material, systemic predisposing factors including dietary deficiency and blood disorders also play a part. Denture stomatitis and Candida in saliva were more frequent in females which is in accordance with results of our study which also shows female predominance [33]. In accordance with others [28, 3]. The most frequent post-insertion complication among diabetics was candidal infection (54.5%) followed by denture stomatitis (21.7%). According to Dorocka et al., the patients with diabetes had a marked higher prevalence of denture stomatitis. The frequency of Candida colonization was raised in diabetics as well which is in accordance to our study [15]. However, another study reports no significant increase in the prevalence

of denture stomatitis among those diagnosed with diabetes mellitus or elevated plasma glucose levels when compared with subjects with normal glucose metabolism [32]. Candida pseudohyphae and oral soft tissue lesions of candidiasis were more prevalent in subjects with diabetes. The presence of Candida pseudohyphae was significantly associated with tobacco smoking, use of removable prosthesis, and poor glycemic control [23]. Ill-fitting dentures contributed to 65% of the prevalence of denture stomatitis. The patients were not aware of changes that occur in bone and mucosa and that they needed relining or rebasing. Another study which is consistent with results in our study showed that 78% of the subjects had used the same complete denture for over 5 years and 44% believed that a complete denture would last for

Figure 4. Bar diagram correlating the type of post-insertion complication in complete denture wearers with the medical condition of the patients. X-Axis represents the type of medical condition and Y axis represents the percentage of post-insertion complication among patients with various medical conditions. The results were analysed using One way ANOVA Test $P = 0.003$ and was found to be significant ($P < 0.05$). The most common post insertion complication among normal patients was found to be denture stomatitis (71.7% ; red), among diabetic patients candidal infections (54.5% ; orange) among hypertensives, asthmatic and thyroid patients traumatic ulcer (26.1%, 8.7%, 4.3% respectively ; green).



more than 10 years [10]. The main reason for candidal infections in our study was found to be the use of denture at night (72%) and unhygienic dentures (28%). This is in concordance with another study which reported 64% slept with their prostheses and 44% removed them from the mouth only for cleaning. None of the patients surveyed knew anything about brushes designed specifically for complete dentures [10].

In our study, the prevalence of traumatic ulcers was (5.5%) among which 34% were females and 66% were males which is in contradiction to another study which states females were affected more than males in terms of traumatic ulcers. The main cause of traumatic ulcer in our study was due to overextended margins. Traumatic ulcers most commonly develop within 1–2 days after insertion of new dentures, but can also be found in old ill-fitting dentures, because of overextended denture flanges, or unbalanced occlusion which is similar to our study [11]. Some conditions may suppress resistance of the mucosa to mechanical irritation such nutritional deficiencies, diabetes mellitus or xerostomia [9]. Traumatic ulcers were found in 6.3% of the patients in this study, and occurred more frequently during the first 5 years of denture use, which is similar to some reports [12].

The main reason for post-insertion complications among the older patients were poorly designed dentures [39, 30, 18]. In most cases of denture stomatitis, elimination of denture faults, control of denture plaque and discontinuous denture wearing are adequate treatment. The routine use of antiseptic or antimycotic drugs seems unnecessary [35]. Topical application of local anaesthetic agents and anti-inflammatory gels can be advised [37].

This study helps the dentist assess the incidence of denture stomatitis, ulcerations and candidal infections occurring in medically compromised patients and its relationship with both age and gender. It creates awareness that every patient must be educated on new practices, equipment to maintain prosthesis, and also notice changes in their mucosa and report to the dentist. They also need to be aware of alterations that occur in alveolar bone and soft tissue due to resorption over time thereby focussing on the need for relining, rebasing or new prosthesis. Small sample size, geographic isolation, socio economic factors, and lack of inclusion of patients wearing hybrid prosthesis, precision attachments, overdentures, implant supported dentures contribute to the limi-

tations of the study.

Conclusion

Within the limitations of this study, it is concluded that there is a strong association between the prevalence of denture stomatitis, candida infections and traumatic ulcers in both normal and medically compromised denture wearers. The most common post insertion complication among normal patients was denture stomatitis, among diabetic patients it was candidal infections and among hypertensives, asthmatic and thyroid patients traumatic ulcers were common.

Hence, regular follow-up, patient education and awareness is essential in complete denture wearers to identify any changes in bone and mucosa periodically and addressing them with appropriate prosthodontic intervention to prevent local and systemic complications.

Author Contributions

Author 1 (Jerusha Santa Packyanathan) carried out the retrospective study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 (Padma Ariga) aided in the conception of the topic, participated in the study design, statistical analysis, supervised in the preparation of the manuscript and author 3 (Ganesh Jeevanandan) helped in study design and coordinated in developing the manuscript. All the authors have equally contributed in developing the manuscript.

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